

REMARKS

Claims 1-24 are currently being cancelled in lieu of new claims 25-48 in order to fix grammatical errors and place the claims in proper U.S. format. Applicant asserts the claim scope of new claims 25-48 is exactly the same as the claim scope of cancelled claims 1-24. Accordingly, Applicant asserts no claim scope has been surrendered by these amendments.

These amendments do not introduce new matter within the meaning of 35 U.S.C. §132. Accordingly, entry of the amendments prior to examination is respectfully requested.

1. Rejection of Claims 1-4, 7-11 and 13-24 Under 35 U.S.C.

§102(b)

The Office Action states that claims 1-4, 7-11, and 13-24 are rejected under 35 U.S.C. §102(b) as being anticipated by Hwang, et al. (U.S. Patent 4,634,744). In particular, the Office Action states,

Hwang et al. disclose a method for continuously homopolymerizing ethylene or interpolymerizing ethylene with one or more 1-olefin in a reactor in the presence of a catalyst which comprises a transition metal derivative, wherein the polymer so formed is discharged from the reactor in a molten solution stream and wherein a deactivator comprising ethoxylated hydrocarbylamines of the formula of $R'_{3-n}N[(OCH_2CH_2)_mOH]_n$ is added to the molten polymer solution to deactivate the Ziegler-Natta catalyst (abstract; claim 1). Attention is drawn to Examples, wherein a copolymerization of ethylene and 1-butene is carried out (col. 6, lines 4-5). Thus, the present claims are anticipated by the disclosure of Hwang et al.

RESPONSE

Claims 1-4, 7-11, and 13-24 have been cancelled rendering the above rejection moot.

Notwithstanding, for a reference to anticipate an invention, all of the elements of that invention must be present in the reference. The test for anticipation under section 102 is whether each and every element as set forth in the claims is found, either expressly or inherently, in a single prior art reference. *Verdegaal Bros. V. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

Applicant respectfully believes U.S. Patent 4,634,744 (referred to herein as Hwang, et al.) fails to disclose, teach, or suggest "A liquid-phase process for polymerizing at least one α -olefin of formula $\text{CH}_2=\text{CHR}$, wherein R is H or a $\text{C}_1\text{-C}_6$ alkyl radical, comprising the steps of:

- continuously polymerizing in a liquid reaction medium the α -olefin with a catalyst system comprising at least one transition metal compound;
- continuously withdrawing a solution of liquid reaction medium soluble polymer;
- mixing in one or more mixing stages the solution of liquid

reaction medium soluble polymer with an organic deactivator having at least one hydroxy group, and a boiling point higher than 150°C, wherein a ratio of the molecular weight (MW) of the organic deactivator to the hydroxy group (n_{OH}) of the organic deactivator is between 20 and 100."

In particular, Applicant respectfully believes Hwang, et al. fails to disclose, teach, or suggest a liquid-phase process which continuously withdraws a solution of liquid reaction medium soluble polymer, as recited by independent claim 25.

Claims 26-48 depend directly or indirectly from independent claim 25, and necessarily include all of the limitations of the claim(s) from which they depend.

In light of the above, claims 25-48 are therefore believed to be patentable over Hwang, et al. Accordingly, reconsideration and withdrawal of the rejection is requested.

2. Rejection of Claims 1-24 Under 35 U.S.C. §103(a)

The Office Action states that claims 1-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Takayuki, et al. (U.S. Patent 4,551,509) in view of Naga, et al. (U.S. Patent 6,281,302). In particular, the Office Action states,

Takayuki et al. disclose a process for producing ethylene polymer or ethylene copolymer, comprising the steps of (a) continuously polymerizing ethylene or ethylene and an α -olefin in a reaction mixture at a pressure of at least 300 kg/cm² and a temperature of at least 130°C in the presence of a catalyst composed of a compound of a transition metal of groups IVa and VIa of the Periodic Table and an organometallic compound of a metal of Groups I and III of

the Periodic Table and (b) adding a polyalkylene glycol to the reaction mixture to deactivate the catalyst (claim 1).

The difference between the present claim and the disclosure of Takayuki et al. is the requirement of a liquid phase polymerization process instead of a gas phase polymerization process.

Naga et al. disclose a process for olefin polymerization in the presence of a catalyst comprising a transition metal compound of Group IV of the Periodic Table and an organometallic compound of metal of Group I, II or XIII of the Periodic Table (claim 1). Naga et al. further disclose that "slurry polymerization or solvent polymerization using an inert hydrocarbon solvent (e.g. propane, pentane, hexane, heptane, octane), liquid phase polymerization using no solvent (bulk polymerization) or gas phase polymerization can also be applied" (col. 9, lines 22-28). Thus, in view of the method to utilize the catalyst, gas phase polymerization is equivalence to and exchangeable with liquid phase polymerization. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize liquid phase polymerization in the disclosure of Takayuki et al. and thereby obtain the present invention.

RESPONSE

Claims 1-24 have been cancelled rendering the above rejection moot.

Notwithstanding, The U.S. Supreme Court in *Graham v. John Deere Co.*, 148 U.S.P.Q. 459 (1966) held that non-obviousness was determined under § 103 by (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and, (4) inquiring as to any objective evidence of non-obviousness.

To establish a *prima facie* case of obviousness, the Examiner must establish: (1) that some suggestion or motivation to modify the

references exists; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all the claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

Applicant respectfully believes U.S. Patent 4,551,509 (referred to herein as Takayuki, et al.) fails to disclose, teach, or suggest "A liquid-phase process for polymerizing at least one α -olefin of formula $\text{CH}_2=\text{CHR}$, wherein R is H or a $\text{C}_1\text{-C}_6$ alkyl radical, comprising the steps of:

- continuously polymerizing in a liquid reaction medium the α -olefin with a catalyst system comprising at least one transition metal compound;
- continuously withdrawing a solution of liquid reaction medium soluble polymer;
- mixing in one or more mixing stages the solution of liquid reaction medium soluble polymer with an organic deactivator having at least one hydroxy group, and a boiling point higher than 150°C , wherein a ratio of the molecular weight (MW) of the organic deactivator to the hydroxy group (n_{OH}) of the organic deactivator is between 20 and 100."

In particular, Applicant respectfully believes Takayuki, et al. fails to disclose, teach, or suggest a liquid-phase process which continuously withdraws a solution of liquid reaction medium soluble polymer, as recited by the currently pending claims. In fact, the

Examiner has noted Takayuki, et al. relates to a gas phase process. Thus, in addition to not disclosing, teaching, or suggesting a liquid-phase process which continuously withdraws a solution of liquid reaction medium soluble polymer, Takayuki, et al. does not disclose, teach, or suggest a liquid-phase process, and continuously polymerizing in a liquid reaction medium the α -olefin with a catalyst system comprising at least one transition metal compound.

Moreover, Takayuki, et al. aims at trying to solve a completely different problem in the polymer field. In particular, Takayuki, et al. relates to a gas phase process for producing ethylene polymers or ethylene copolymers comprising the steps of: (a) continuously polymerizing ethylene or ethylene and an alpha-olefin in a reaction mixture at a pressure of at least 300 kg/cm² and a temperature of at least 130°C in the presence of a catalyst composed of a compound of a transition metal of groups IVa to VIa of the Periodic Table and an organometallic compound of a metal of groups I to III of the Periodic Table; and (b) adding a polyalkylene glycol to the reaction mixture to deactivate the catalyst." (col. 2, lines 2 - 11).

In contrast, Applicant has invented a liquid-phase process useful for polymerizing α -olefins wherein the catalyst residues are deactivated without causing any worsening in the final properties of the obtained polymer and improving the recovery of the monomer in the recovery section. (See page 3, line 33 - page 4, line 3 of Applicant's specification)

Accordingly, there is no motivation or suggestion to modify

Takayuki, et al. to arrive at the current invention, nor would there be a reasonable expectation of success given the vast differences between Takayuki, et al. and the current invention.

Naga, et al. does not remedy the deficiencies of Takayuki, et al. In fact, as with Takayuki, et al., Naga, et al. aims at trying to solve a completely different problem in the polymer field. Naga, et al. relates to a solid catalyst component for olefin polymerization which exhibits a high activity and can produce an olefin polymer containing low molecular weight polymers and/or low crystalline polymers produced in very small amount. (See col. 2, lines 23-28).

Accordingly, there is no motivation or suggestion to modify Naga, et al. to arrive at the current invention, nor would there be a reasonable expectation of success given the vast differences between Naga, et al. and the current invention. Additionally, given the vast differences between the problems which Takayuki, et al. and Naga, et al. aim to solve, and the lack of suggestion to combine the references, Applicant respectfully traverses the Examiners combination of Takayuki, et al. and Naga, et al. See MPEP § 2141.01(a) and 2143.01.

Additionally, Naga, et al. does not alone, or in combination with Takayuki, et al. teach, suggest, or disclose all of the limitations of independent claim 1 and enable one of ordinary skill in the art to arrive at the currently claimed invention.

Claims 26-48 depend directly or indirectly from independent

claim 25, and necessarily include all of the limitations of the claim(s) from which they depend.

In light of the above, claims 25-48 are therefore believed to be patentable over Takayuki, et al. in view of Naga, et al. Accordingly, reconsideration and withdrawal of the rejection is requested.

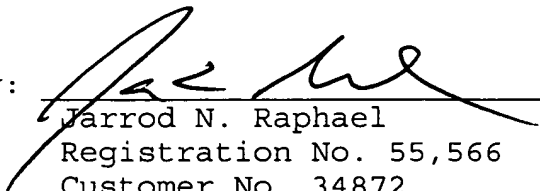
CONCLUSION

Based upon the above remarks, the presently claimed subject matter is believed to be novel and patentably distinguishable over the references of record. The Examiner is therefore respectfully requested to reconsider and withdraw all rejections and allow all pending claims 25-48. Favorable action with an early allowance of the claims pending in this application is earnestly solicited.

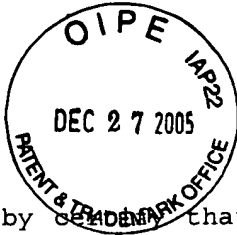
The Examiner is welcomed to telephone the undersigned practitioner with any questions or comments.

Respectfully submitted,

By:

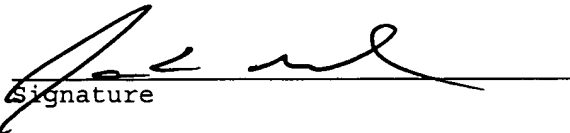

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